

A NEW SPECIES OF THE GENUS *TOMOCERUS* (*TOMOCERINA*) FROM CHINA (COLLEMBOLA: TOMOCERIDAE) WITH A DISCUSSION OF THE SUBGENERA OF *TOMOCERUS*¹

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ABSTRACT: A new species *Tomocerus (Tomocerina) yiliensis*, from Xinjiang of northwest China is described. It is distinct from all other members of the subgenus because of the large number of setae on the trochanteral organ. The presence of more than one trochanteral organ seta forces a re-examination of the subgenera of *Tomocerus*, the subgenus *Tomocerina*, and the role of trochanteral organ setae in dividing subgenera of *Tomocerus*.

KEY WORDS: *Tomocerus* Collembola, Tomocerina, Tomocerinae, China, new species.

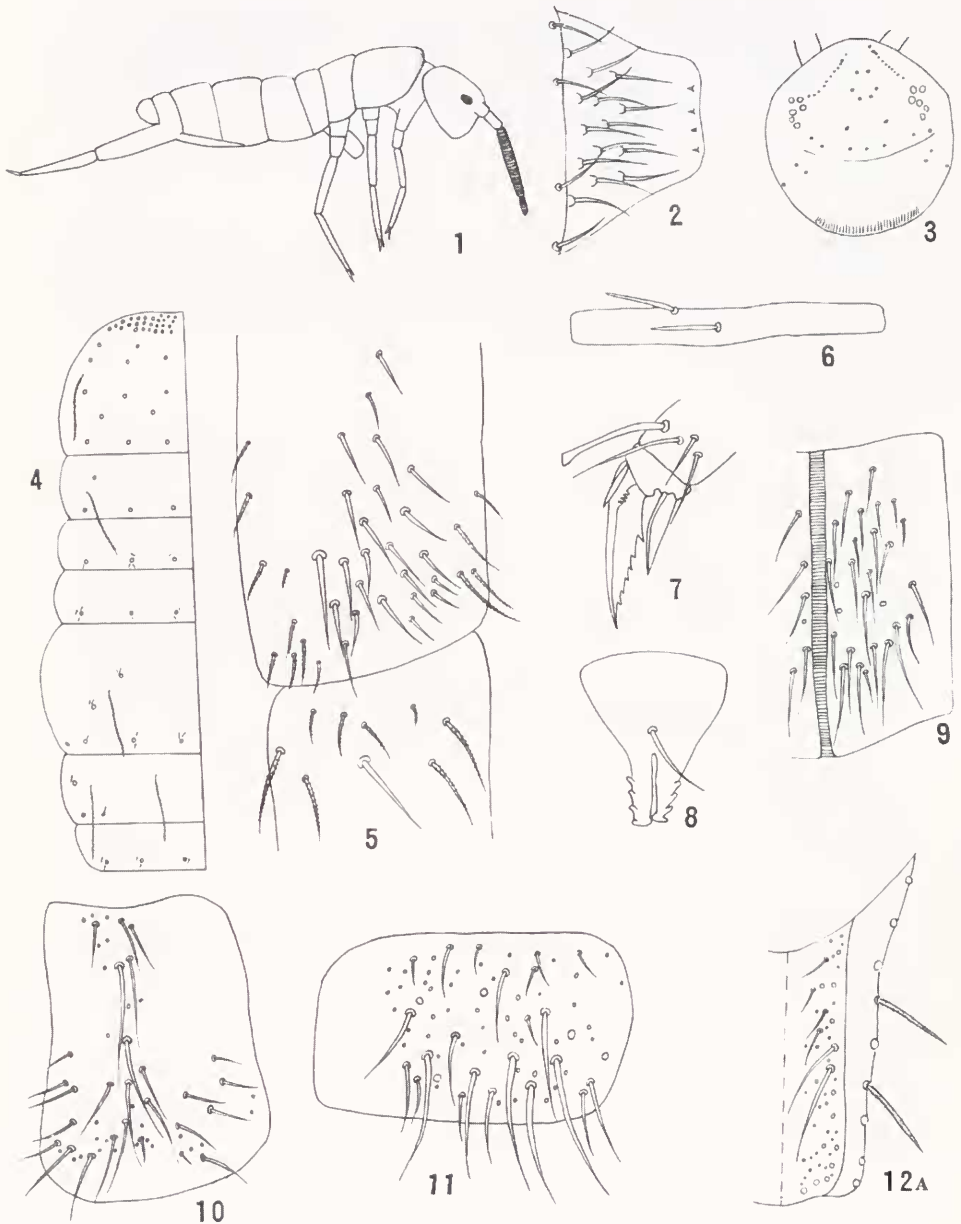
The genus *Tomocerus* was created by Nicolet (1842) and later given the type species *Macrotoma minor* Lubbock 1862 (opinion 239 ICZN, 1954:363). The genus was characterized by long, greatly subdivided antennae with the 3rd antennal segment more than 3 times as long as the fourth; an elongate toothed mucro, dental spines, 6 + 6 eyes and body scales. Meanwhile, Frauenfeld described a related genus *Tritomurus* in 1854, differing primarily in the absence of eyes. In 1896 Schäffer placed these genera in a subfamily of Entomobryidae – Tomocerinae – and in 1913 Börner raised them to family level. Both treatments have continued to the present day. In 1897 Schäffer created a new genus, *Lepidophorella* with a third antennal segment less than twice as long as the fourth. This and related taxa were eventually split off as a separate subfamily *Lepidophorellinae*, distinguished from the other Tomoceridae by its relatively much longer 4th antennal segment. The species with the shorter 4th antennal segment are now placed in the subfamily Tomocerinae. In addition most genera of *Lepidophorellinae* lack antennal annulations and have much shorter mucrones than do genera of the subfamily *Tomocerinae*. Except for a few obvious anthropochore species, the subfamily *Tomocerinae* is limited to the northern hemisphere, whereas the *Lepidophorellinae* are found only in the southern hemisphere. Others have described additional related genera or subgenera in the *Lepidophorellinae*: by Womersley *Neophorella* (1934) and *Millsia* (1942); by Salmon *Antennacyrtus* (1941), and *Novocerus* (1942); and by Ireson and Greenslade, *Lasofinus* (1990). In the Tomocerinae, Paclt described *Pogonognathellus* (1944) and Mills described *Tomolonus* (1949). Most subgenera of Tomocerinae were created by Yosii: *Monodontocerus* and *Tomocerina* (1955), *Aphaenomurus* and *Plutomurus* (1956) and *Lethemurus* (1970). Yosii (1967) considered most of these as separate genera. Other authors have varied from treating all as valid genera to considering all

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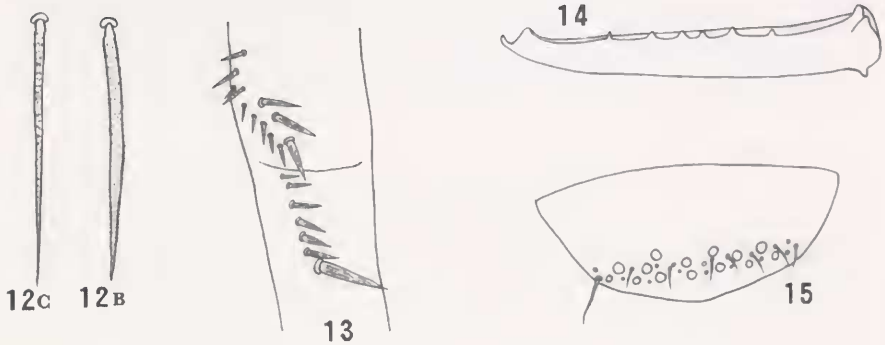
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Figs. 1-15. *T. Tomocerina yiliensis* sp. nov. 1. habitus; 2. labrum; 3. dorsum of head; 4. dorsal chaetotaxy of Th. II - Abd. V; 5. trochanteral organ; 6. hind tibiotarsus, showing blunt setae; 7. hind foot complex; 8. tenaculum; 9. anterior face of ventral tube; 10. posterior face of ventral tube; 11. lateral flap of ventral tube; 12 A. manubrium (dorsal view), dotted line represents mid line; 12B. lateral seta of manubrium; 12C. dorsal seta of manubrium; 13. dental spines; 14. mucro; 15. upper anal flap chaetotaxy.



as subgenera of *Tomocerus* but all have considered these supraspecific taxa as members of the family Tomoceridae. Below we describe a new species of the subgenus *Tomocerina*.

***Tomocerus (Tomocerina) yiliensis*, NEW SPECIES**
(Figs. 1-15)

Maximum body length: 3.6 mm.

Color: Ground color pale yellow. Eye patches dark blue to black. Ant. III & IV with dark blue pigment. Pale blue pigment also present on tibiotarsi and anterior margin of Th. II (Fig. 1). Scales brownish, hyaline and heavily striated.

Head: Eyes 6+6, all subequal. Antennae 0.31-0.42 times as long as body and 1.8 – 2.6 times as long as head. Third segment 6 - 9 times as long as fourth. Labral setae 4/5,5,4, all smooth; each of distal 3 rows with clear basal papillae. Anterior margin of labrum with 4 recurved spinules (Fig. 2).

Chaetotaxy: Dorsum of head with 13-23 setae of different size near the antennal bases and 6 anterior interocular macrochaetae in a medial hexagon, 7 macrochaetae directly anterior to median furrow, 3 + 3 lateral median setae and posterior margin with a row of 36-75 small setae (Fig. 3). Macrochaetae and bothriotricha of thorax and abdomen as shown in Fig. 4. Upper anal flap with 14 large setae arranged in 2 irregular transverse rows (Fig. 15). Body macrochaeta with 0-3 basal microsetae.

Legs: Trochanteral organ with one somewhat larger and 8-22 smaller smooth setae on trochanter and one large seta on femur (Fig. 5). Two (rarely one) blunt setae on ventral side of tibiotarsus 3, finely ciliate setae, distributed as shown in Fig. 6. Unguis slender with a paired pseudonychia 0.28-0.52 times as long as inner edge of unguis; inner unguis teeth 6-7, rarely 4 or 5. Unguiculus lanceolate without inner teeth. Tenent hair spatulate, 0.64-0.96 times as long as inner edge of unguis (Fig. 7).

Tenaculum: rami with 4+4 teeth, corpus unscaled with 1 smooth seta (Fig. 8).

Ventral tube: sealed on all sides, anterior face with 27-50 striate setae of different sizes on each side (Fig. 9); posterior with 37-61 striate setae of different sizes (Fig. 10); lateral flap with 50-96 striate setae of different sizes (Fig. 11).

Furcula: Dens 1.32 – 2.6 times as long as manubrium and 4-5 times as long as mucro. Manubrium scaled dorso-laterally with a row of 8-10 large setae on each side, all weakly ciliate and strongly tapering near apex but not spinelike (Figs. 12A & B); dorsally with 2 setaceous stripes, each consisting of numerous acuminate, striate setae of different sizes (Fig. 12C). 14-24 of them very large. Dental spines dark brown, formula 10-12(13)/4-6, 1. Proximal spines arranged in 2 irregular rows; all simple with fine longitudinal striations (Fig. 13). Mucro elongate with numerous ciliate setae; outer dorsal lamella entire with 2-6 intermediate teeth; apical and antepical teeth subequal (Fig. 14).

Types: Holotype female, China: Xinjiang, Yili, Narat Prairie, altitude 1500m-1600m, VIII-12-2000, Jian-xiu Chen, Songjie Wang & Fang Wang colls. Locality C9086; paratypes: 15 females, all on slides, same data as holotype. Deposited in the Department of Biology, Nanjing University.

Ecology: Found under stones and decayed wood in grassland.

Etymology: The new species is named after the locality of the types.

Discussion: The new species shares some characteristics with Japanese *T. Tomocerina aokii* Yosii (1972), such as the number of inner teeth on the unguiculus and intermediate teeth on the outer dorsal lamella of the mucro. However, it differs from *aokii* in tenaculum setae and in having more than one trochanteral organ seta. The latter characteristic differentiates *yiliensis* from all other described species of *Tomocerina*. Over time, a number of features have come to be considered as distinguishing characteristics of the different subgenera of *Tomocerina*. In the Tomocerinae, these include the number of basal mucronal teeth, the presence or absence of a small toothlet on one basal mucronal tooth, the presence or absence of large spine-like scales on the inner face of the base of the dentes, the presence of large lateral spines on the base of the dentes, the presence or absence of eyes, and the nature of the trochanteral organ. In this family this occurs on the base of the femur as well as the trochanter. It has been long accepted that there is a sharp distinction taxa having only a single such seta on femur and trochanter (*Tomocerus*, *Pogonognathellus*, *Monodontocerus*, *Tomocerina*), those with more than one seta on the femur but only one on the trochanter (*Aphenomurus* and *Tomolomus*) and those with more than one on both femur and trochanter (*Plutomurus* and *Lethemurus*). Until the present study, *Tomocerina* was considered a member of the first group. The trochanteral organ setae on *T. yiliensis* are different in size and distribution from those of other multisetaceous Tomocerine trochanteral organs and their analogy with these remains in doubt. Assuming that these are trochanteral organ setae we re-examined Nearctic specimens assigned to species of *T. (Tomocerina)*. This showed that some populations of *T. (Tomocerina) lamelliferus* may have more than one trochanteral organ seta on their trochanter and that specimens from Colorado previously identified as *T. (Tomocerina) curtus* are in fact a species of *Tomolomus* lacking clear spine-like outer basal setae on the dens. In addition, we have recently examined specimens of *Tritomurus scutellatus*, and these appear to have one trochanteral organ seta on the trochanter. These discoveries make the distinction between *Tomocerina* and *Plutomurus* less clear cut; however, the number and size of the setae in the femoral trochanteral organ and the presence or absence of spine-like setae on the outer basal dentes still serve to distinguish the vast majority of *Plutomurus* and *Tomocerina* species. A reassessment of the criteria separating the supraspecific categories of Tomocerinae is clearly in order. This might result in fusing some of these subgeneric categories.

Most species of *Tomocerina* are very close to the genus *Tomocerus* (*s. s.*) except for the absence of a toothlet on the outer basal tooth of the mucro. *T. (Tomocerina) yiliensis* differs from members of the subgenus *Tomocerus* (*s. s.*)

in having more than one trochanteral organ seta on the trochanter as well as lacking the basal toothlet. *Tomocerina* is a small subgenus containing only 9 - 12 species, four of these were described or have been reported from China: *minutus* Tullberg 1876 from Shanxi and (as *varius*) from Yunnan, *calceus* and *purpurithorus* Liu et al. 1999 from Sichuan and *yiliensis* from Xinjiang.

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